The bottled materials collected are placed, on reaching home, in aquaria with 7x7 inch parallel sides one and one-fourth inch in depth from back to front. After a few hours the debris will have settled, and if a strong light be placed at one face of the aquarium the free-swimming rotifers will collect on the side toward the light, and can be discovered with a lens and be picked up with a pipette. In solid watch glasses these general collections can be examined quickly for new species with the low power of the binocular and unfamiliar forms transferred to the live-box or the micro-glass trough for special study.

Narcotising the mass of rotifers in the watch glass is readily effected by 1% cocaine. They may be killed and fixed by a drop of ½ to ⅛% osmic acid. They should be exposed to the osmic acid for a minute only and then removed to formalin of 2½% strength, changing it several times until well washed.

The sorting out of different species is done under the binocular by means of a bristle mounted in a suitable handle. They are then picked up with a fine pipette and placed in an appropriate micro-cell, and finally mounted in 2½% formalin.

The ringing of the micro-cells may be done as follows: first a thin ring of picture copal varnish; then several coats of Heath's cement (gold size-shellac-India rubber); finally finishing with three more coats of gold size.

METHODS OF PRESERVING CERTAIN MARINE BIOLOGICAL SPECIMENS

F. Martin Duncan (J. R. M. S., Dec. 1917) brings together methods which he has found most practical and successful in preserving marine plant and animal life and in preparing it for microscopic examination. Many of these methods are standard; but summarizing some of them may be of value.

Anaesthetising

Place the smaller and specially sensitive medusæ in just sufficient sea-water for free expansion and swimming, and add two drops of 1% solution of hydrochloride of cocaine, gently stirring with a glass rod. Repeat at five minute intervals until the tentacles do not contract when gently touched. Add 10-20 cc. of 4% formaldehyde solution, stirring for several minutes. Store in 10% formaldehyde. Do not allow specimens to remain in cocaine longer than absolutely necessary before adding the formaldehyde, as the former softens the jelly of the medusæ.

The author regards cocaine as, on the whole, the best anaesthetic for the most of the smaller forms of marine life. Solutions of coacine must be made anew since they do not keep well—becoming filled with fungoid growths.

Hydroid zoophytes, simple and compound ascidians, holothurians, anemones, and the like may be stupefied effectively with menthol. This is slow in action and does not simulate to contraction. The animals are submerged in clean sea-water and methol crystals are strewn over the surface. Their solution is slow, and in twelve or twenty-four hours depending on the size and sensitiveness of the animals and the amount of water, the specimens will be narcotised in an extended position, and may then be killed and fixed in any suitable fluid.

Fixing

The author prizes Bouin's fluid (Picric acid, saturated aqueous solution, 75 parts; formalin 25 parts; glacial acetic acid, 5 parts) as the best fixative for histological purposes. It has great power of penetration, kills quickly, and fixes well. It allows after treatment of the most varied sort. Next in desirability he considers saturated solution of corrosive sublimate.

Weak osmic acid (a few drops of a ½% solution added to the water in which the organisms are) is suggested for marine Protozoa. Radiolaria are effectively killed and fixed in corrosive sublimate. Sphærozoa give good results in equal parts of sea water and 70% alcohol with a trace of tincture of iodine added.

For Echinoderm larvæ an exposure of four minutes to a cold saturated solution of corrosive sublimate is recommended. For whole mounts dilute cochineal stain—as Mayer's alcoholic cochineal formula.

Small sponges are placed, on collection, in 1% solution of osmic acid and left there for five minutes, then transferred to strong alcohol and changed twice. Stain sections in Mayer's alcoholic cochineal.

Compound ascidians with contractile zooids may be handled to advantage by placing in clean sea water, narcotizing with methol, and then plunging for three to ten minutes in glacial acetic acid. Wash in 50% alcohol and pass thru successive grades to a preserving strength. Use no metal in the operation.

For small crustacea, both larvæ and adults, first treatment with 5% formaldehyde in sea water is recommended. Transfer to 70% alcohol.

For demonstration mounts it is necessary to guard against overstaining. Weak alcoholic picro-carmine cleared in turpineol is advocated as a means of staining.

THE SILVERMAN ILLUMINATOR FOR MICROSCOPES

This illuminator, invented by Professor Alexander Silverman of the School of Chemistry, University of Pittsburg, is a small, circular tube lamp which can be fitted quickly to any objective. It moves up and down with the barrel and furnishes a diffused and uniform illumination at the exact place where it is needed. It is suitable both for low and high power work, and may be used both for direct examination and for photography of opaque objects.

Much structural detail is revealed by this device which the older forms of illumination do not give. It is a low voltage tungsten lamp, and may be supplied either in colorless glass or in daylight (blue) glass. Its life is about 100 hours. There is no image of the source of illumination nor does the light strike the front of the lens except as reflected from the object.

The intensity of the light reaching the eye is lower than in other types of illumination, and yet because it is directed upon the spot observed the observer sees more. There is no glare, no waste light, no unduly contracted pupil, no unnecessary eye strain.

The lamps are manufactured by Ludwig Hommel & Co., Pittsburg, Pa.